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| NEEDLE & ROSENBERG, P.C. SUITE 1000 999 PEACHTREE STREET ATLANTA, GA 30309-3915 | | | BERMAN, SUSAN W | |
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DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/699,994

Applicant(s)

SCRANTON ET AL.

Examiner

Susan W. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/26/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 7-13,39,47,48,50,52,54,56,58-67 and 69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,14-34,40-46,49,51,53,55,57 and 68 is/are rejected.
- 7) ☒ Claim(s) 35-38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Election without traverse to prosecute the invention of a method wherein the elected species is a method for producing a polymer wherein the monomer is butyl acrylate, the functional end groups are hydroxyl groups, the initiator is a two-component system comprising methylene blue and N-methyldiethanolamine and the surfactant is sodium dodecyl sulfate, claims 1-6, 14-27, 31-38, 40-46, 49, 51, 53, 55, 57 and 68. Claims 28-30 have been rejoined with the claims drawn to the elected species.

Claims 7-13, 39, 47-48, 50, 52, 54, 56, 58-67 and 69 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

It is noted that the status of claim 39 should be “withdrawn” and the status of claim 69 should be “withdrawn, currently amended”.

Response to Amendment

Applicant has amended the claims to recite “forming a single phase monomer in water microemulsion”.

The rejection of claims as being unpatentable over Dietz et al (5,952,398) in view of Uy et al (6,709,716) and Kozakiewicz et al (4,956,400) is withdrawn. Dietz et al disclose microemulsions having a bicontinuous structure.

Response to Arguments

Rejections under 35 USC 112: With respect to claims 15 and 55, Applicant argues that selection of a monomer for its preferred mode of termination is disclosed as being selection of a monomer that will produce a polymer having a desired functionality at one end or, alternatively, both ends. However, it is noted that claim 1 recites that the end group functionalities are produced by the initiator system. Applicant argues that the radical active centers provided by the initiator react with the monomer being

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polymerized and become end groups of the resulting polymer chain. The examiner has not noticed any disclosed components of the initiator system having isocyanate, cyanide, nitro, nitrile groups. How are these end group functionalities produced and where is this recited in the instant claims? It is suggested that the claim 15 be rewritten to read "...preferred mode of termination of the polymer chain by combination or disproportionation". It is suggested that claim 55 be rewritten to read "...specified functionality derived from the initiator system".

Capek (I) and Capek (II): Applicant argues that Capek et al (I) and Capek (II) each fail to teach a process whereby an initiator system produces monomer-soluble radical active centers containing desired end groups. This argument is not persuasive because Capek et al (I) teach forming butyl acrylate/water microemulsions containing surfactant, adding a water-soluble photoinitiator and illuminating the microemulsion to photoinitiate polymerization of the monomer. The oligomer or polymer resulting would have an end group desired by the practitioner. Capek et al (I) teach that water-soluble initiating radicals are formed from the water soluble initiator. Capek (II) teaches that activated benzophenone in a SDS/BA microemulsion can be deactivated, can produce a radical pair through hydrogen abstraction and/or can be quenched by monomer. Capek (II) teaches that the results indicate that the excited states of Ant or BP take part in the polymerization reaction. See page 402, paragraph 5, to page 403. Capek (II) also teaches the interaction with alcohols such as butanol and incorporation of butanol into microparticles.

The rejection of claims as being anticipated over Capek et al (I) is maintained. The rejection of claims as being anticipated by Capek (II) is withdrawn. New grounds of rejection are set forth under 35 USC 103(a) over the two articles in combination.

Kuo et al and Morgan et al: Applicant argues that dibenzylketone is not a water-soluble photoinitiator. This argument is not persuasive because although Kuo et al disclose "oil-soluble photoinitiator", Kuo et al disclose dissolving DBK in SDS aqueous solution by ultrasonic treatment in "Methods", page 1217. Applicant further argues that there is no suggestion in the references to make the alleged

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combination. This argument is addresses in the rejection of record wherein the motivation to combine references is clearly set forth.

Abusleme: Applicant argues that Abusleme fails to teach choosing an initiator system and an illumination scheme to produce a desired molecular weight for the resulting polymer. This argument is unpersuasive because Abusleme clearly teaches that the photopolymerization can be stopped in event of runaway polymerization and can, thus, be used to control extent of polymerization. One of ordinary skill in the art at the time of the invention would have immediately envisioned that the polymerization can be stopped upon achieving a desired molecular weight.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6, 14-46, 49, 51, 53, 55, 57 and 68 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, lines 6-8, and in claim 68, lines 5-7, It is not clear from the phrase “one kind of monomer-soluble radical active centers” whether the initiator system produces plural “radical active centers” containing “desired end group functionalities” or the initiator system produces one kind of radical active center containing the desired end group functionality. With respect to claims 1 and 68, It is not clear what substances are present in the initiator system to produce end groups such as the hydroxyl, isocyanate, cyanide, nitro, nitrile or amine groups set forth in claim 23. Claim 15: It is not clear what is meant by the phrase “monomer is chosen for its preferred mode of termination”. It is not clear how a specific monomer can have a “preferred mode of termination”. It is suggested that the claim read “preferred mode of termination of the polymer chain by combination or disproportionation”. Claim 55: It is not clear whether the “end groups of specified functionality” are provided by the monomer structure or

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by the initiator system, as set forth in claim 1. It is suggested that claim 55 be rewritten to read

“...specified functionality derived from the initiator system”.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-6, 14-17, 19, 21, 24-26, 30-34, 40-46, 51, 53, 55, 57 and 68 are rejected under 35 U.S.C. 102(b) as being anticipated by Capek et al, in the article “Kinetics of Photopolymerization of Butyl Acrylate in Direct Micelles”. Capek et al disclose a process of forming a microemulsion of butyl acrylate, surfactant and water and polymerization initiated in the presence of photoinitiator, such as 2,2-dimethoxy-2-phenylacetophenone, by monochromatic UV light. See “Photophysics of Radical Formation”, pages 179-180. Capek et al teach that water-soluble radicals derived from the water-soluble initiator govern the kinetics of microemulsion polymerization and that the initiating radicals are formed only in the monomer swollen micelles or particles (page 177, second paragraph, and page 178, second paragraph). Capek et al teach that butyl acrylate forms an excited state upon irradiation and that the photoinitiator generates radicals, thus affecting molecular weight of the polymer (see page 180). The process of photoinitiated radical formation disclosed by Capek et al would be expected to provide a poly(butylacrylate) having butyl groups as desired end groups.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 20, 22, 23, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capek et al, in the article "Kinetics of Photopolymerization of Butyl Acrylate in Direct Micelles", as applied to 1-6, 14-17, 19, 21, 24-26, 30-34, 40-44, 46, 51, 53, 55, 57 and 68 above, and further in view of Capek, in the article "Photopolymerization of Butyl Acrylate Microemulsion". See the discussion of the disclosure of the Capek et al article above. Capek et al do not teach using a co-surfactant, as set forth in instant claims 2, 20, 22, 23 or 27. Capek et al do not teach using a hydrogen abstraction initiator, as set forth in instant claim 28.

Capek in "Photopolymerization..." discloses a process of forming a microemulsion of butyl acrylate and/or acrylonitrile, surfactant and water to which naphthalene, anthracene or benzophenone is added and initiating polymerization by exposure to monochromatic UV light. Capek teaches that butyl acrylate forms an excited state upon irradiation and that benzophenone in its triplet state can generate a radical pair through hydrogen abstraction from the emulsifier and quenching by monomer, thus affecting molecular weight of the polymer (see page 402). Furthermore, Capek teaches photoinitiated hydrogen abstraction from the emulsifier and teaches adding butanol as co-emulsifier and, therefore, discloses a process which would have been expected to provide hydroxyl end groups for the polymer derived from the interaction of hydrogen abstracting component and emulsifier.

It would have been obvious to one skilled in the art at the time of the invention to employ a co-emulsifier, such as butanol, in the microemulsions containing a water-soluble photoinitiator taught by Capek et al, as taught by Capek "Photopolymerization..." in an analogous method of photopolymerization in microemulsion. One of ordinary skill in the art at the time of the invention would have been motivated by an expectation of providing hydroxyl end groups for the polymer derived from

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the emulsifier/co-emulsifier, as taught by Capek. It would have been obvious to one skilled in the art at the time of the invention to include a hydrogen abstracting photoinitiator, as taught by the Capek article, in the method for polymerization disclosed by the Capek et al "Kinetics..." article. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the hydrogen abstracting property of the initiator to interact with a co-emulsifier to provide hydroxyl end groups, as taught by Capek in "Photopolymerization..."

Claims 18 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Capek et al, in the article "Kinetics of Photopolymerization of Butyl Acrylate in Direct Micelles" in view of Capek, in the article "Photopolymerization of Butyl Acrylate Microemulsion", as applied to 1-6, 14-17, 19-28, 30-34, 40-44, 46, 51, 53, 55, 57 and 68 above, and further. See the discussion of the disclosure of the Capek et al and Capek articles above. With respect to claim 18, neither article mentions selecting surfactant and co-surfactant based on the hydrophile-lipophile balance. With respect to claim 29, neither article discloses ketone photoinitiators having hydroxyl groups.

Dietz et al teach surfactants and co-surfactants, providing HLB, and using hydroxy-phenyl ketones in analogous microemulsion photopolymerizations. See column 11, lines 59-61, column 12, lines 7-12, and columns 16-19. It would have been obvious to one skilled in the art at the time of the invention to employ any of the water-soluble hydroxy phenyl ketones taught by Dietz et al as the water-soluble photoinitiator in the microemulsion photopolymerization taught by Capek et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success because Capek et al teach requiring water-soluble photoinitiators and Dietz et al disclose that the hydroxy phenyl ketones are useful water-soluble photoinitiators in microemulsion photopolymerization. It would have been obvious to one skilled in the art at the time of the invention to select surfactants and co-surfactants to provide a suitable HLB in the microemulsion photopolymerization disclosed by Capek et al

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“Kinetics...” in combination with Capek “Photopolymerization...”, as taught by Dietz et al. Capek provides motivation by teaching emulsifier/co-emulsifiers in the disclosed method. Dietz et al provide motivation by teaching that it is desirable to have a balance between hydrophobic and hydrophilic elements in the surfactants.

Claims 1-4, 15-17, 19-28, 30, 40-44, 46, 49, 53, 55, 57 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo et al, in the article “Photoinitiated Polymerization of Styrene in Microemulsions” in view of Morgan et al, in the article “Kinetics and Mechanism of Microemulsion Polymerization of Hexyl Methacrylate”.

Kuo et al disclose a method for polymerizing styrene in an oil/water microemulsion comprising surfactant, dibenzyl ketone photoinitiator, pentanol and water. Kuo et al teach that the molecular weight of the polymer can be easily controlled by controlling light intensity and time of irradiation. Kuo et al also teach that polymerization in microemulsions only occurs in the monomer reservoir encapsulated in the particle. See the Introduction. In the example, Kuo et al dissolve photoinitiator in an SDS aqueous solution and then add styrene, toluene and pentanol to the solution, followed by exposure to UV light (page 1217, “Methods”).

Morgan et al teach a model and rate for the conversion of a monomer in a microemulsion as a function of time and initiator concentration. Morgan et al teach that when a water-soluble free radical initiator is added to a microemulsion of monomer and surfactant, radicals are generated in the aqueous phase and enter the droplets of monomer-surfactant. As the radical propagates, monomer is recruited from the surrounding medium and chain growth terminates by chain transfer, bimolecular termination or coalescence of two growing particles. See page 1898, “3. Theory”.

The difference between the instantly claimed method and the method disclosed by Kuo et al is that applicant recites a water-soluble photoinitiator while Kuo et al teach that DBK is an oil-soluble

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photoinitiator and must be dissolved by ultrasonic treatment in SDS aqueous solution. However, It would have been obvious to one skilled in the art at the time of the invention add water-soluble initiator to the monomer/ surfactant mixture taught by Kuo et al in order to take advantage of the model for conversion and rate as a function of time and initiator concentration taught by Morgan et al. One of ordinary skill in the art at the time of the invention would have been motivated by an expectation of controlling the conversion of monomer and rate of polymerization in the method disclosed by Kuo et al, as taught by Morgan et al. Another difference from the instantly claimed method is that Kuo et al do not mention that the initiator system produces radical active centers containing desired end group functionalities, however, the example discloses the presence of a photoinitiator and pentanol, thus providing for end group functionalities in the same manner as set forth by applicant. The polymerization in microemulsion taught by Kuo et al would have been expected to provide desired end group functionalities for the resulting polymer or oligomer since the microemulsion disclosed contains photoinitiator dissolved in aqueous solution and pentanol.

Claims 1-3, 5, 15-17, 24-26, 40-44, 46, 51, 53, 55, 57, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abusleme et al (6,096,795). Abusleme et al disclose (co)polymerization of fluorinated olefinic monomers in aqueous emulsion, including microemulsion, in the presence of photoinitiators and UV-VIS radiation. The photoinitiator can be a water-soluble photoinitiator. Abusleme et al teach that the thermochemical stability of the copolymer produced depends on the nature of chain ends derived from the initiator and teaches selection of initiator to provide stable end groups. See column 2, line 59, to column 3, line 43. Example 8 teaches preparing a microemulsion of water, surfactant and initiator, adding monomer, exposing the microemulsion to continuous UV irradiation and further addition of initiator, thus disclosing the instantly claimed process steps.

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The difference from the instantly claimed process is that Abusleme et al do not mention choosing an initiator system and an illumination scheme to produce a desired molecular weight. It would have been obvious to one skilled in the art at the time of the invention to select an initiator and exposure to UV light scheme to obtain a polymer having stable end groups and a desired molecular weight. It is known in the art that if UV exposure is stopped, the polymerization process will stop because the photoinitiator is not activated, thus one of ordinary skill in the art at the time of the invention would have been able to provide a polymer having a desired molecular weight. It would have been obvious to one skilled in the art at the time of the invention to select a water soluble photoinitiator to use in the process disclosed by Abusleme et al because Abusleme et al teach that the photoinitiator can be water soluble.

Allowable Subject Matter

Claims 35-38 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The cited prior art does not teach the instantly claimed method wherein the photoinitiating system comprises the components set forth in claims 35-39.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan W. Berman whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 571 273 8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SB
12/29/2005



Susan W Berman
Primary Examiner
Art Unit 1711